Stimuli-Responsive Mechanically Adaptive Polymer Nanocomposites

Electronic Supporting Information

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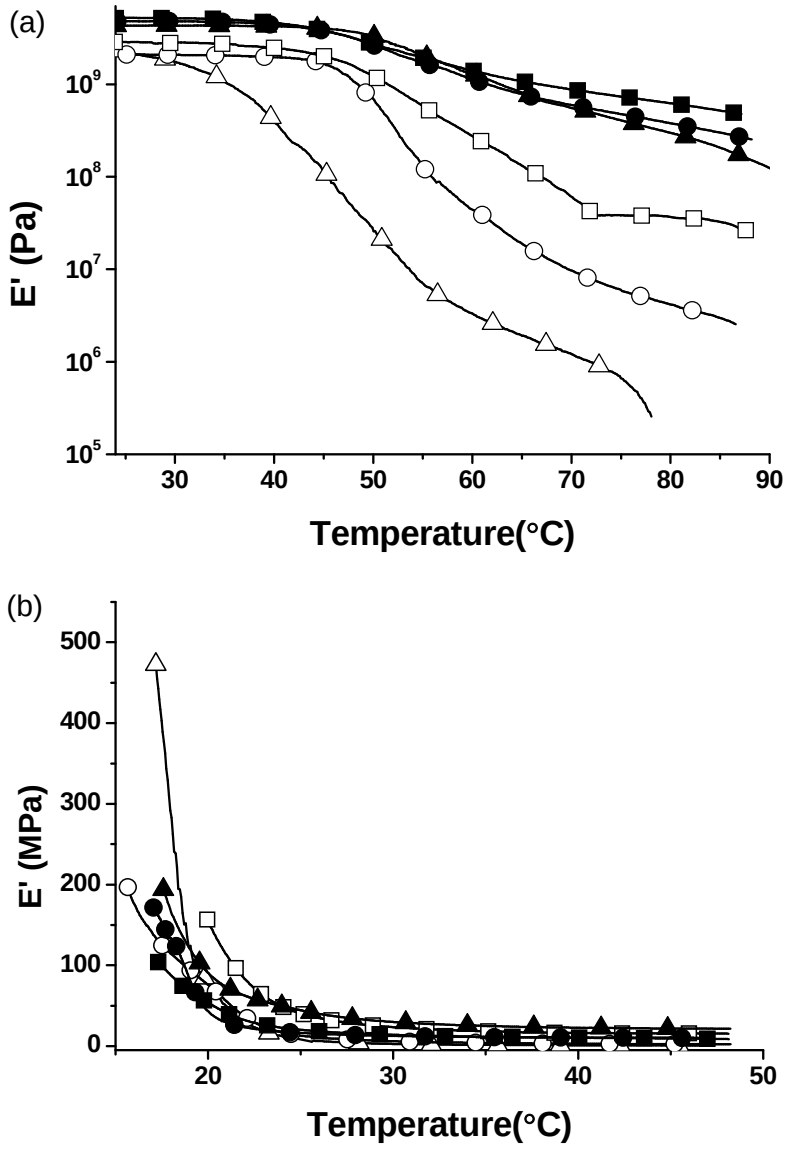

Figure S1. (a) Tensile storage moduli *E′* of dry films of neat PVAc and PVAc/tunicate whisker (TW) nanocomposites as a function of temperature and composition: 0% v/v TW (△), 0.8% v/v TW (○), 4% v/v TW (□), 8.1% v/v TW (▲), 12.2% v/v TW (●), 16.5% v/v TW (■). Data were acquired by dynamic mechanical analysis (DMA). (b) Tensile storage moduli *E′* of ACSF-swollen (for 1 week at 37 °C) films of neat PVAc and corresponding PVAc/tunicate whisker (TW) nanocomposites. Reprinted with permission from ref 11b. Copyright 2009 Elsevier.

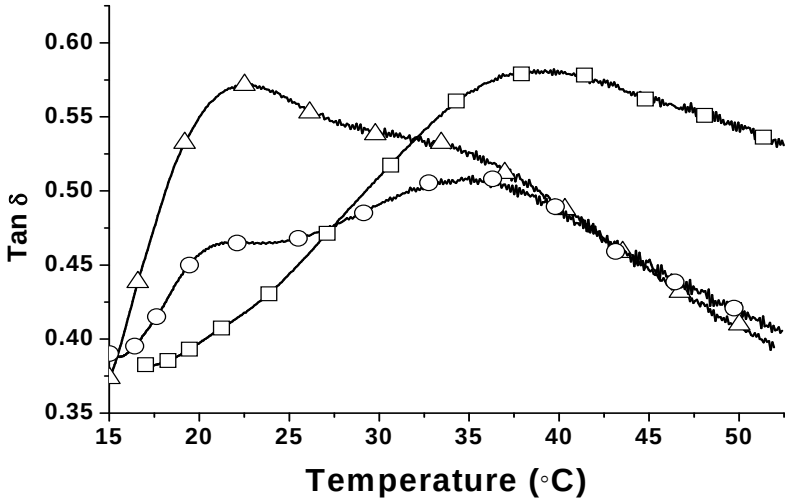

Figure S2. Loss tangent vs. temperature plots of DMTA sweeps of polymer/cellulose whisker nanocomposite films comprising 11.4-11.8% v/v of cellulose whiskers and PVAc/PBMA at a ratio of 60/40 (△), 40/60 (○), 20/80 (□) swollen with ACSF (after immersion at 37°C for 1 week).

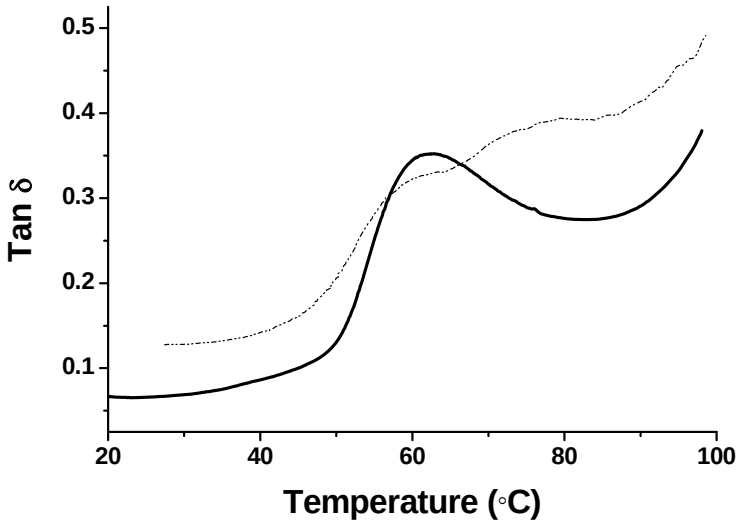

Figure S3. Loss tangent vs. temperature plots of DMTA sweeps of polymer/cellulose whisker nanocomposite films comprising 11.6%v/v of cellulose whiskers and PVAc/PBMA at a ratio of 40/60: Dry nanocomposite showing a single peak (solid line) the same nanocomposite when swollen in ACSF at 37°C for 1 week and re-dried showing two distinct peaks (dashed line).

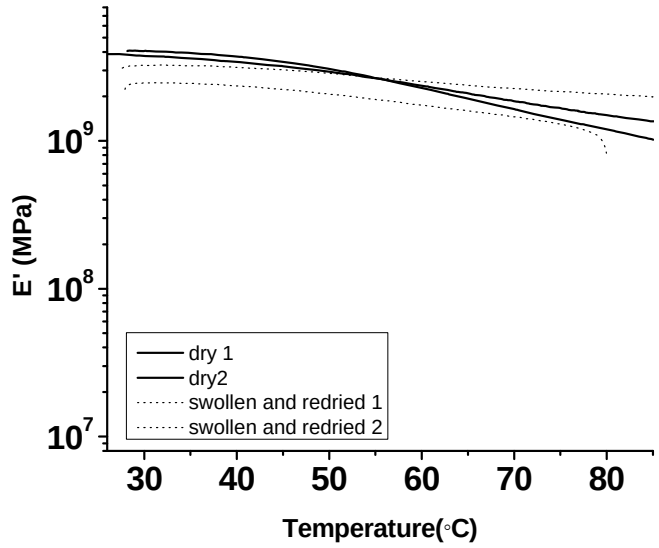

Figure S4. DMA temperature sweeps of 23.4%v/v PBMA/cellulose whisker nanocomposite films showing the reversibility of the stiff -soft transition. The materials were tested in the dry state and after subjecting them to a cycle of exposure to water at 65°C for 1 week and then re-drying at 65°C for 48 h.

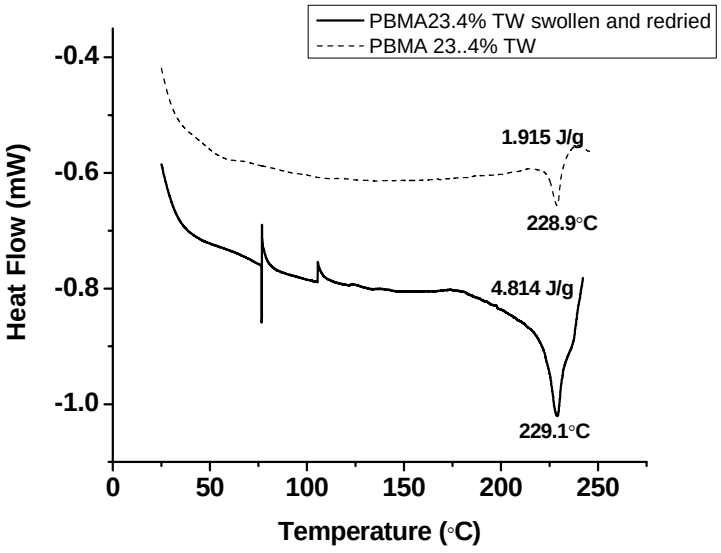

Figure S5. DSC thermograms of 23.4% v/v PBMA/cellulose whisker nanocomposite films showing the reversibility of the stiff - soft transition. The sample was tested in the dry state (dashed) and after subjecting it to a cycle of exposure to water at 65°C for 1 week and re-drying at 65°C for 48 h (solid).